Course Name	Code\No.	Number of Credits			
		Theo.	Lab.	Train.	Credit
Applications of GIS in Hydrology	HWR 316	2	1	-	3
Pre-Requests		HWR 221 - HWR 231			

Course Objectives:

This course aims to provide knowledge to the students about Geographic information systems and their applications in water recourses field and to give intensive training to students in using GIS software and applying it in analysis of spatial data.

Course Contents:

1. Introduction about GIS: spatial data, GIS software, advantages of using GIS, Methods of spatial data entry, GPS.
2. Coordinates and projection systems: coordinate systems, latitudes and longitudes, geographic projections, orientation of map projection, properties of map projection, UTM.
3. Applications of GIS: GIS applications in various fields, questions GIS help to answer, GIS analysis, Query tools, Algebraic operations, distance operators, context operators and Surface interpolation.
4. Applications in hydrology: Direct applications of GIS in hydrology, Using GIS with hydrological models, using GIS with DEM, Using GIS to extract watershed boundary and channel network.
5. Introduction of remote sensing and its relation with GIS.
6. Presentation of students term projects.
7. GIS practical exercises: fifteen practical exercise in GIS lab and term project chosen by the student and provide report and presentation at the end of the term.

Course outcomes:

It is expected that the student will get the following knowledge and experience:

1. Recognize GIS and benefits of using it.
2. Define spatial data.
3. Recognize DEM and their applications.
4. Recognize how to produce digital maps.
5. Recognize to extract watershed boundary and channel network from digital amps.
6. Recognize how GIs are used for spatial analysis.
7. Recognize how GIS can be used as tool for decision-making.
8. Explain how to use GIS as a tool of decision-making.
9. prepare lab reports and term project report and presentation
10. Choose a topic of term project.
11. Collect data and present results in report.
12. Provide oral presentation.
13. Demonstrate ability to use GIS software
14. Demonstrate ability to work with digitizer and scanner as source of spatial data.
15. Demonstrate ability to use GPS to collect spatial data.

Evaluation Method:

The evaluation is performed by periodic tests, presentation of term project and reports of term project and lab exercises.

References:

- الخزامي، محمد (١٩٩٨) نظم المعلومات الجغرافية
- **Gurnell, A. M. (2000) Hydrological application of GIS, published by J. Wiley**
- **Fetter, C.W. (1998) Contaminant hydrogeology, Prentice Hall, 2nd edition.**
- **www.gisclub.net/inf/**
- **http://www.ce.utexas.edu/prof/maidment/gishydro/home.html**
- **ARCGIS Software**